

The Status of the 1990 Objectives for Physical Fitness and Exercise

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Synopsis

During the past 5 years, considerable progress has been made in clarifying the relationship be-

tween physical activity and health and in collecting previously unavailable information about the activity levels of children and adults. Several of the objectives are likely to be achieved by 1990. Nevertheless, important questions remain to be answered, and data necessary to know the status of some objectives are not available. The established benefits of regular physical activity include a reduced risk of coronary heart disease, desirable weight control, and reduced symptoms of anxiety and mild-to-moderate depression. Other health effects appear likely, but are less firmly established.

The salubrious effect of regular physical activity on reducing the risk of coronary heart disease appears to exist even at low levels of physical activity. More information is needed about the type and intensity of physical activity necessary to achieve the various health benefits ascribed to it. Although most people appear aware of the characteristics of activities likely to produce moderate to high levels of physical fitness, only 10–20 percent of the adult population participates in such activity. The number and effect of worksite physical fitness programs are too poorly documented to determine if the pertinent objectives can be achieved. Fewer than two-thirds of the number of children recommended in the objectives participate in daily physical education classes.

ELEVEN OF THE PUBLIC HEALTH SERVICE'S 1990 objectives for the nation concern physical fitness and exercise (1). When the objectives were developed in 1980, less baseline information was available for physical fitness and exercise than for most other areas. During the ensuing 5 years, considerable progress has been made in clarifying the relationship between physical activity and health and in collecting previously unavailable information about the activity levels of children and adults. Several of the objectives are likely to be achieved by 1990 (table 1). Nevertheless, much remains to be learned, and most segments of society would benefit from increased levels of physical activity. The following is a brief summary of the current status of the 1990 objectives for physical fitness and exercise.

Status of the Objectives

Health effects. The established beneficial effects of physical activity on health include a reduced risk of

coronary heart disease (CHD), desirable weight control, and reduced symptoms of anxiety and mild-to-moderate depression (2–4). Beneficial effects on the prevention and control of hypertension, diabetes, osteoporosis, and certain psychiatric and psychologic conditions appear likely, but are less firmly established (2,4). The temporarily increased risk of sudden death during vigorous physical activity is outweighed by the overall reduced risk of CHD from habitual vigorous activity (2). Information about the incidence of musculoskeletal injuries and other possible adverse effects is not available (5).

Prevalence of appropriate physical activity. Three of the objectives on physical fitness and exercise pertain to the prevalence of participation in appropriate physical activities by specific age groups. For the 1990 objectives, appropriate physical activity is defined as that which produces moderate-to-high

levels of cardiorespiratory fitness and, therefore, is characterized by (a) rhythmic contraction of large muscle groups, (b) an intensity that requires 60 percent or more of maximal aerobic capacity, (c) a frequency of three or more sessions per week, and (d) a duration of 20 minutes or more per session. For children, appropriate activity is that which can be continued in adulthood, such as those activities that require only one or two persons to perform. Maximal aerobic capacity (VO₂ max) declines with

age and differs for men and women. Therefore, some activities require 60 percent VO₂ max of an older person but less in a younger person. Table 2 shows approximate ages when some common activities require 60 percent VO₂ max for the average person (personal communication, 1984, Carl J. Casperson, PhD, MPH, Behavioral Epidemiology and Evaluation Branch, Center for Health Promotion and Education, Centers for Disease Control).

Few surveys of the activity patterns of persons in

Table 1. Current status and projected likelihood of achieving the 1990 physical fitness and exercise objectives

<i>Objective</i>	<i>Best estimate of current status</i>	<i>Likelihood of achievement by 1990</i>
<i>Health effects</i>		
1. By 1990, data should be available with which to evaluate the short- and long-term effects of participation in programs of appropriate physical activity	Data vary with specific health effect	Not a quantifiable objective; progress will be made; questions will remain
<i>Prevalence of appropriate physical activity practices</i>		
2. By 1990, the proportion of children and adolescents 10–17 years old participating regularly in appropriate physical activities, particularly cardiorespiratory fitness programs that can be carried into adulthood, should be greater than 90 percent	66 percent (no trend data)	Poor
3. By 1990, the proportion of adults 18–65 years old participating regularly in vigorous physical exercise should be greater than 60 percent	10–20 percent (no trend data)	Poor
4. By 1990, 50 percent of adults 65 years and older should be engaging in appropriate physical activity, for example, regular walking, swimming, or other aerobic activity	10–20 percent (no trend data)	Poor
5. By 1990, data should be available for regular monitoring of national trends and patterns of participation in physical activity	Baseline data available	Good
By 1990, these data from monitoring participation in physical activity should include public recreation programs in community facilities	Data not available	Unknown
<i>Public and professional awareness</i>		
6. By 1990, the proportion of adults who can accurately identify the variety and duration of exercise thought to promote most effectively cardiovascular fitness should be greater than 70 percent	70 percent duration and frequency of exercise (2 local surveys); 50 percent intensity (1 national survey)	Good
7. By 1990, the proportion of primary care physicians who include a careful exercise history as part of their initial examination of new patients should be greater than 50 percent	47 percent (2 State surveys)	Good
<i>Worksite fitness programs</i>		
8. By 1990, the proportion of employees of companies and institutions with more than 500 employees that offer employer-sponsored fitness programs should be greater than 25 percent	Data not available	Unknown
9. By 1990, data should be available to evaluate the efforts of participation in programs of physical fitness on job performance and health care costs	Data not available	Unknown
<i>Children and adolescents</i>		
10. By 1990, the proportion of children and adolescents 10–17 years old participating in daily school physical education programs should be greater than 60 percent	36 percent (stable over 10 years)	Poor
11. By 1990, a methodology for systematically assessing the physical fitness of children should be established	3 methodologies available	Achieved
By 1990, at least 70 percent of children and adolescents 10–18 years old should be participating in an assessment of their physical fitness	Data not available	Unknown

the United States have obtained information compatible with this definition. None of the definitions of physical activity used in past surveys is similar enough to another to allow comparison of the results (6). National polls and data from selected population groups suggest that the amount of time spent by adults in vigorous leisure-time activity has increased in the past 10–20 years (6,7), but the data do not allow a quantitative estimate of the increase.

The prevalence estimates from sources using a definition of appropriate physical activity suggested in the 1990 objectives are shown in figure 1. The estimate for children and adolescents is adapted from the National Children and Youth Fitness Survey (8); the estimates for adults are based primarily on preliminary analyses of data from 16 States that participated in 1984 in the CDC-State Behavioral Risk Factor Surveillance System.

The fourth objective concerns the level of participation in public programs and trends in the pattern of physical activity. No information is available about the use of public facilities. Most surveys show that the most commonly reported leisure-time physical activities of adults are walking, swimming, calisthenics, bicycling, and jogging or running. Variation in the definitions of participation precludes any assessment of national trends in the absolute or relative frequencies of these activities.

Important impediments to the achievement of these four objectives by 1990 are (a) insufficient information about the determinants of an active lifestyle to permit effective and efficient promotional efforts, (b) a social or economic environment not conducive to an active lifestyle for large segments of the population, and (c) unrealistically high levels of participation specified in the objectives for children, adults, and older adults, given current levels of activity. In addition, surveillance systems to monitor progress toward the objective do not exist for activity patterns among children and for participation in public or private recreational programs and facilities. The absence of surveillance systems is not an inherent impediment to achieving the objectives per se; however, it precludes regular assessment of progress and adjustments in strategy based on current data.

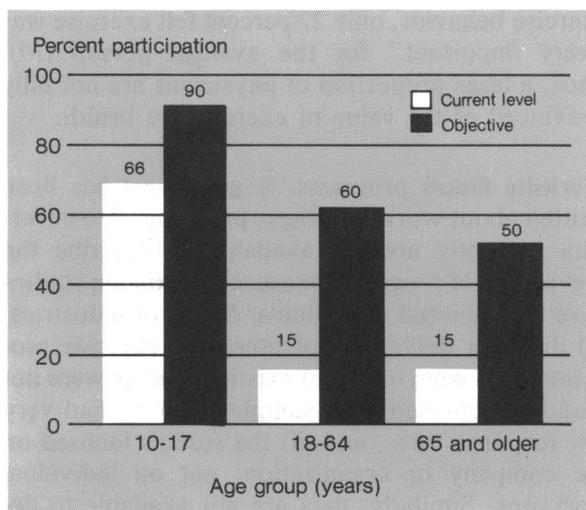
Awareness. Unpublished data from surveys conducted in a Dallas, TX, suburb and in Los Angeles, CA, indicate that more than 70 percent of adults know that, to promote cardiovascular fitness, vigorous physical activity needs to be done 3 or more times per week and maintained for 20 minutes or more per session. Fifty-nine to 90 percent of the

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Table 2. Age at, and above which, activity requires 60 percent of maximal aerobic capacity by sex

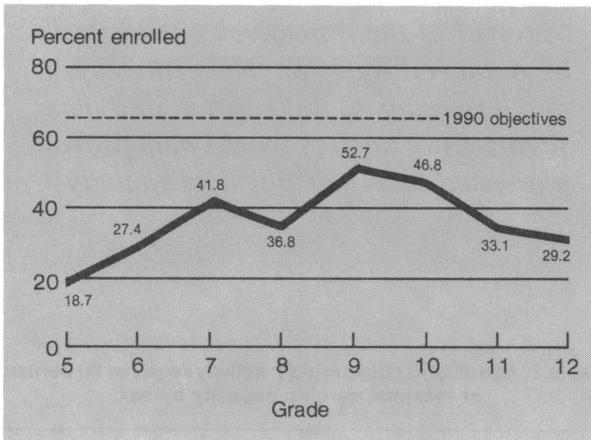
Activity	Age, years	
	Males	Females
Aerobics class	51	44
Basketball	46	36
Mowing lawn-raking lawn	67	67
Swimming laps:		
0.5 mph (35 lengths per hour)	69	70
0.75 mph (53 lengths per hour)	48	39
1 mph (70 lengths per hour)	27	All
Tennis	46	36
Walking:		
3 mph (20 minutes per mile)	75	78
4 mph (15 minutes per mile)	59	55
Running, jogging at 5 mph (12 minutes per mile)	All	All

Figure 1. Current prevalence and 1990 objective of appropriate activity, by age group



time respondents to the Los Angeles survey and to the Perrier survey (9) correctly identified specific activities that are vigorous enough to promote cardiovascular fitness, such as running or swimming.

Figure 2. Percentage of children enrolled in daily physical education classes



Only 10–58 percent of the time did they correctly identify activities that are not vigorous enough, such as baseball, bowling, or golf.

Surveys of physicians in Massachusetts and Maryland indicated that just less than 50 percent of primary care physicians routinely inquire about their patients' exercise practices (10,11). Whether the inquiries include questions about the frequency, duration, and intensity of the exercise, as suggested by the 1990 objectives, is unknown.

On the surface, the likelihood of achieving these two objectives of public and professional awareness by 1990 appears to be good. However, national estimates do not exist for either. In addition, whereas 47 percent of Massachusetts primary care physicians reported that they routinely asked about exercise behavior, only 27 percent felt exercise was "very important" for the average person (10). Thus, a large proportion of physicians are not fully convinced of the value of exercise for health.

Worksite fitness programs. A great deal has been written about worksite fitness programs. However, data currently are not available to describe the prevalence of programs because (a) existing studies have been limited to particular States or industries, (b) different definitions of fitness or exercise programs have been used, (c) existing studies were not based on representative samples or have had very low response rates, and (d) the studies focused on the company or organization, not on individual worksites. Similarly, data are not available to determine the effects of participation in fitness programs on job performance and health care costs.

Children and adolescents. Methods of determining the fitness of children and adolescents are available,

and surveys have been conducted. It is not known how many persons participate in such tests annually.

Overall, approximately 36 percent of children and adolescents, ages 10–17 years, participate in daily physical education programs (12) (fig. 2). This is essentially unchanged since 1974 and well below the 1990 objective of 60 percent (1). Participation, however, varies markedly by grade. More than 90 percent of children in grades 5–8 are enrolled in physical education classes but, of those enrolled, fewer than half have daily physical education classes. In contrast, the percentage of children in grades 9–12 enrolled in physical education classes falls from 81.2 percent in grade 9 to 52.1 percent in grade 12 but, of those enrolled, more than half have daily physical education classes (12). Therefore, to achieve a higher percentage of students in daily classes requires different approaches for the different grades. In grades 5–8, physical education classes need to be more frequent, whereas in grades 9–12, enrollment needs to be increased.

Important impediments to the achievement of these objectives for children and adolescents are (a) pressure on schools to emphasize "basic" academic skills; (b) pressure on schools to reduce costs; (c) the large number of decisionmakers who need to be influenced because of local control of school curriculums; (d) the paucity of available shower facilities—access ranges from 21 percent for grades 5–6 to 63 percent for grades 7–9 (12); and (e) an unrealistically high objective, in light of current data. Similar to the objectives on the prevalence of appropriate physical activity practices, no surveillance system of participation in school physical education programs exists.

Discussion

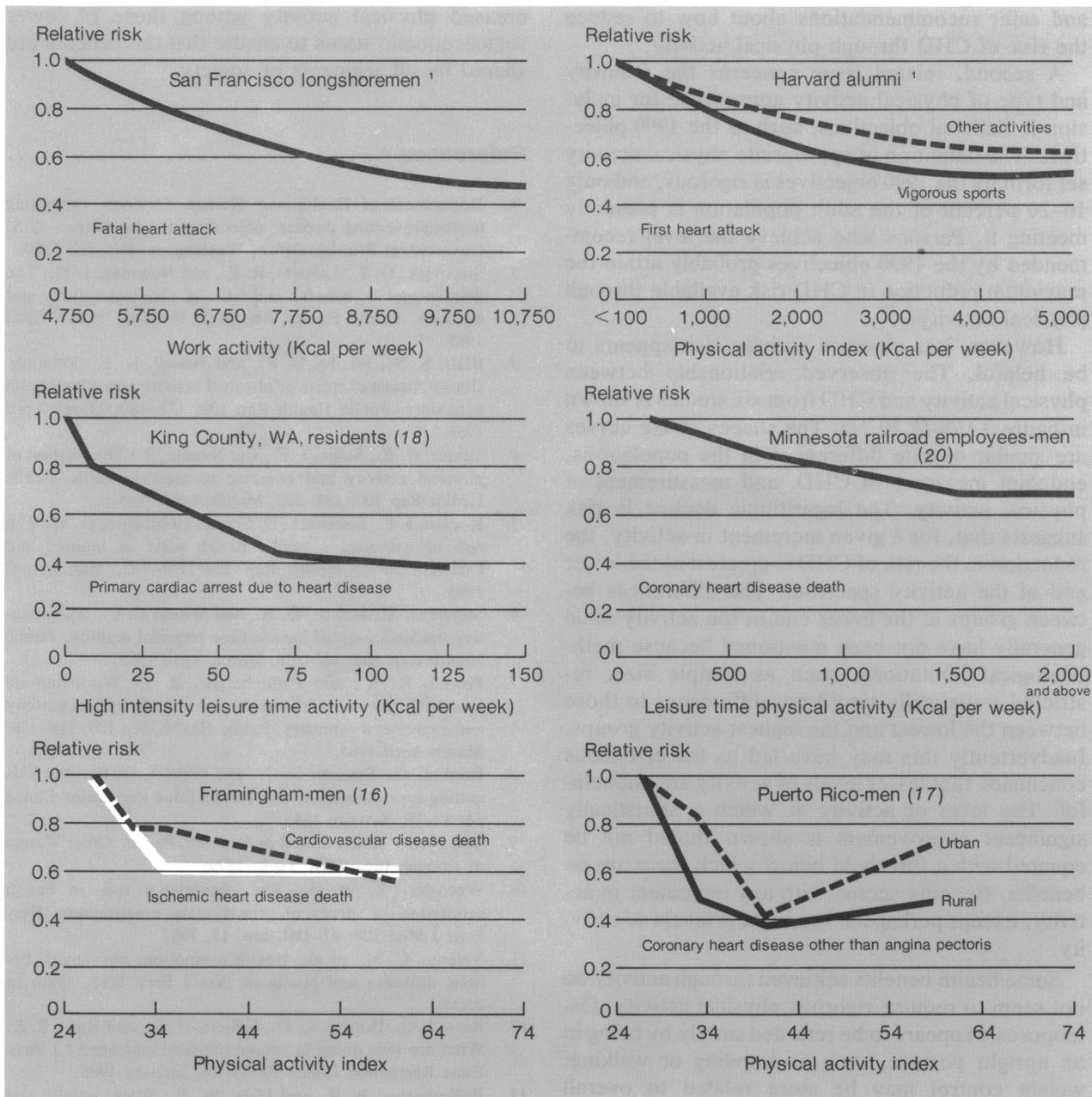
Even though several physical fitness and exercise objectives are not likely to be achieved, considerable progress has been made. Research on the health effects of physical activity has progressed, but more is needed. Surveys by the National Center for Health Statistics, projects sponsored by the President's Council on Physical Fitness and Sports and the Office of Disease Prevention and Health Promotion, and projects of the Centers for Disease Control will provide valuable information about the prevalence and trends of certain physical activity patterns. Promotional efforts by the President's Council on Physical Fitness and Sports and a variety of public and private agencies are likely to influence favorably the knowledge, attitudes, and

practices of U.S. citizens with respect to the benefits of appropriate physical activity.

A few particularly noteworthy issues deserve comment. First, many important questions remain about the salubrious effect of physical activity on CHD. Several careful observational studies of the association between activity and CHD document that the risk of CHD is reduced among more active persons (13-18). Evidence suggests that this is not entirely due to the selection of a more active life-

'The level of activity at which a statistically significant improvement is shown should not be equated with a threshold below which there are no benefits. Benefits accrue with any increment in activity, except perhaps at the highest level of activity.'

Figure 3. Relative risk of adverse cardiac event by level of physical activity: 6 studies



¹ SOURCE: Thomas, G.S., Lee, P.R., Franks, P., and Paffenbarger, R.S.: Exercise and health, the evidence and the implications. Oelgeschlager, Gunn, & Hain, Publishers, Inc., Cambridge, MA, 1981.

style by those who are intrinsically less susceptible to CHD (2). In fact, the reduction in risk appears to be greater for persons who are obese or have hypertension (19).

Nevertheless, several important areas need more research. More information is needed about the dose-response effect of physical activity on CHD, the effects on CHD of beginning a more active lifestyle in the middle or later years, and the factors that affect the risk of sudden death during exercise. These and other research needs are listed elsewhere (2). Resolution of these issues would provide better and safer recommendations about how to reduce the risk of CHD through physical activity.

A second, related issue concerns the intensity and type of physical activity appropriate for inclusion in national objectives, such as the 1990 objectives. The definition of appropriate physical activity set forth by the 1990 objectives is rigorous, and only 10–20 percent of the adult population is presently meeting it. Persons who achieve the level recommended by the 1990 objectives probably attain the maximum reduction in CHD risk available through physical activity.

However, less vigorous activity also appears to be helpful. The observed relationship between physical activity and CHD from six studies is shown in figure 3 (16–18,20,21). The shapes of the curves are similar despite differences in the populations, endpoint measures of CHD, and measurement of physical activity. The logarithmic decline in risk suggests that, for a given increment in activity, the reduction in the risk of CHD is greatest at the lower end of the activity spectrum. The differences between groups at the lower end of the activity scale generally have not been mentioned because methodological limitations, such as sample size, restricted statistically significant differences to those between the lowest and the highest activity groups. Inadvertently this may have led to the erroneous conclusion that lesser levels of activity are not helpful. The level of activity at which a statistically significant improvement is shown should not be equated with a threshold below which there are no benefits. Benefits accrue with any increment in activity, except perhaps at the highest levels of activity.

Some health benefits achieved through activity do not seem to require vigorous physical activity. Osteoporosis appears to be retarded simply by being in an upright posture, such as standing or walking; weight control may be more related to overall energy expenditure regardless of intensity; and activities of daily living may be best maintained

among the elderly through exercise designed to promote flexibility and strength. Therefore, future objectives should encourage regular physical activity, regardless of intensity. Some physical activity three or more times per week for 20 or more minutes per session, regardless of intensity, is likely to provide important public health benefits.

Finally, to the extent that the data are available, participation in a regular physical activity program appears to be more common among persons of higher socioeconomic status (6). Special efforts need to be made to overcome the barriers to increased physical activity among those of lower socioeconomic status to ensure that the benefits are shared by all segments of society.

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The Need for Professional Doctors of Public Health

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Synopsis

Planning, organizing, and operating today's complex health care systems or heading Federal, State, and city public health agencies in the United States and other countries require professionals broadly prepared in the meaning, philosophy, and strategies of public health. It is and has been recognized that the best trained clinical physician could not be expected to know the policies and practices of official public health programs. The chief health official of a State or other jurisdiction, for example, deals with the epidemiology of many diseases; with all aspects of the environment; with hospitals, drugs, health manpower, and nutrition; with issues of health economics, finance, and poli-

tics; and with administration. For these tasks, most of medical education is irrelevant.

To produce the needed specialists, candidates with a BA degree would be educated as doctors of public health. The proposed 5-year postgraduate curriculum is as demanding as the training for the MD degree, but completely different. The 38 subjects or courses in the curriculum are grouped into four categories: basic tools of social analysis, health and disease in populations, protection of health and prevention of disease, and health care systems and management.

At present, MPH degree holders take only a handful of core and elective courses and emerge with little systematic knowledge about the majority of problems they face. The DrPH candidates at schools of public health spend most of their time on research and dissertation writing—adequate preparation for university teachers, but academia is not the goal of most candidates, nor the greatest need of society. Recruits for the proposed new doctorate in public health may be found among the thousands of young people who want to do "community health work" but see no way to play a significant role without getting an MD degree first.